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Guidelines for Design, Manufacture, Inspection and Testing of Electronic Enclosures Assembly

Developed by the Requirements for Structural Enclosure Task Group (7-31j) of the Product Assurance Committee (7-30) of IPC

Users of this publication are encouraged to participate in the development of future revisions.

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Table of Contents

1	PREFACE	1	4.5	Castings	14
1.1	Scope	1	4.5.1	General	14
1.2	Purpose	1	4.5.2	Casting Drawings	14
1.3	Applicability	1	4.6	Machined Metal (Hog-Out Construction)	18
1.4	Classification	1	4.6.1	Hog-Out of Thick Plate Stock (>6 inches)	18
1.5	Measurement Units and Applications	2	4.7	Welding	18
1.6	Terms and Definitions	2	4.7.1	Arc Welding	18
1.6.1	Supplier	2	4.7.2	Resistance Welding (RW)	20
1.7	Health and Safety	2	4.7.3	Other Welding Processes	21
2	APPLICABLE DOCUMENTS	2	4.7.4	Deciphering Weld Symbols	21
2.1	Department of Defense	2	4.7.5	Classification of Welds	21
2.2	U.S. Federal Standards	4	4.7.6	Procedure and Personnel Qualification	21
2.3	Telcordia	4	4.7.7	Post Weld Cleaning	22
2.4	TIA	4	4.7.8	In-Process and Final Visual Inspection of Welds	22
2.5	NASA	4	4.8	Brazing	22
2.6	ISTA	4	4.8.1	Types of Brazing	23
2.7	IPC	4	4.8.2	Braze Procedure Qualification and/or Brazing Personnel Qualification	23
2.8	SAE International	4	4.8.3	In-Process and Final Visual Inspection of Brazing	23
2.9	IEC	5	5	MATERIALS AND PROCESSES – NON-METALS	24
2.10	American Society of Mechanical Engineers	5	5.1	Selection and Application	24
2.11	ASTM	5	5.1.1	Composition and Processing	24
3	ENGINEERING DESIGN	5	5.1.2	Compatibility	24
3.1	General	5	5.2	Special Considerations	24
3.1.1	Engineering Drawings	6	5.2.1	Chlorinated Fluorocarbons (CFCs)	24
3.1.2	Content of Assembly Drawings	6	5.2.2	Shelf-Life Limitations	24
3.1.3	Bill of Materials (BOM)/Parts Lists (PL)	7	5.3	Polymer Materials	24
3.1.4	General Design Considerations	7	5.3.1	Application	24
3.2	Selection of Parts, Materials and Tools	11	5.3.2	Part Design Considerations	24
3.2.1	Standard Parts and Materials	11	5.3.3	Molded Plastic Enclosures	26
3.2.2	Non-Standard Parts and Materials	11	5.4	Elastomers	26
3.3	General Fastening	12	5.4.1	Application	26
4	MATERIALS AND PROCESSES – METALS	12	5.4.2	Cured Elastomers	26
4.1	Alloy Selection	12	5.4.3	Non-Cured Elastomers	26
4.2	Aluminum Alloys	12	5.4.4	Silicone Elastomers	26
4.2.1	Form	12	5.5	Foamed Plastics	26
4.2.2	Alloys	12	5.5.1	Application	26
4.2.3	Temper	12	5.5.2	Outgassing and Flammability	26
4.3	Steel	12	5.5.3	Special Considerations	26
4.3.1	Carbon Steel	12	5.6	Plastics	26
4.3.2	Stainless Steel	13	5.7	Insulation Materials	26
4.4	Other Metals	14			

5.7.1	Arc and Tracking Resistance	27	7.5.8	Resin Transfer Molding (RTM)	36
5.7.2	Laminated Plastics	27	7.5.9	Thermoforming	37
5.7.3	Molded Thermosetting Plastics	27	8	FINAL FINISHES	38
5.7.4	Thermoplastics	27	8.1	Wash Primer	38
5.7.5	Classes and Definitions of Insulating Materials	27	8.2	Chromate Conversion Coating (MIL-DTL-5541, MIL-DTL-81706)	38
5.8	Lubricants	28	8.2.1	Type I – Hexavalent Chromium	38
5.8.1	Application	28	8.2.2	Type II – Non-Hexavalent	38
5.8.2	Application Documents	28	8.3	Anodization	39
5.8.3	Lubricant	28	8.4	Materials	39
5.9	Other Materials	28	8.4.1	Epoxies	39
5.9.1	Adhesives	28	8.4.2	Urethanes	39
5.9.2	Silicone	28	8.4.3	Acrylics	39
5.9.3	Coatings	28	8.4.4	Alkyds	39
5.9.4	Encapsulants	28	8.4.5	Vinyls	39
5.9.5	Sealing Materials	29	8.5	Color	39
5.9.6	Cleaning Prior to Application	29	8.5.1	Federal Standard Colors	39
5.9.7	Special Considerations	29	8.5.2	Customer Defined	39
6	MATERIALS NOT RECOMMENDED FOR USE	29	8.5.3	Color Tolerance Sets	40
6.1	Toxic Pyrolytic Materials	30	8.5.4	CIELAB Values	40
6.2	Flammable Materials	30	8.5.5	Specular Gloss (ASTM D 523)	40
6.3	Fragile or Brittle Materials	30	9	NUCLEAR, BIOLOGICAL and CHEMICAL CONTAMINATION SURVIVABILITY	40
6.4	Mercury	30	10	CORROSION CONTROL	40
6.5	Asbestos	30	10.1	Selection of Metals in Direct Contact	40
6.6	Polychlorinated Biphenyls (PCB)	30	10.2	Corrosion-Resisting Metals	41
6.7	Polyvinyl Chloride (PVC)	30	10.3	The Do's of Equipment Design	41
6.8	Cadmium and Cadmium Plating	31	10.4	The Don'ts of Equipment Design	42
6.9	Other Non-Recommended Materials	31	11	BONDING	43
7	MATERIALS AND PROCESSES – COMPOSITES	31	11.1	Purposes of Bonding	43
7.1	Introduction	31	11.2	Resistance Criteria	44
7.1.1	Unique Issues for Composites	31	11.3	Direct Bonds	44
7.2	Limitations of Composites	33	11.3.1	Contact Resistance	45
7.3	Material System and Selection	33	11.4	Direct Bonding Techniques	48
7.3.1	Thermoset Resins	33	11.4.1	Welding	48
7.3.2	Thermoplastic Resins	33	11.4.2	Brazing	48
7.3.3	Constituent Materials	34	11.4.3	Soft Solder	48
7.4	Design Parameters	34	11.4.4	Bolts	49
7.5	Fabrication Considerations	35	11.4.5	Rivets	49
7.5.1	Cure and Consolidation Processes	35	11.4.6	Conductive Adhesive	51
7.5.2	Vacuum Bag Molding	35	11.5	Indirect Bonds	51
7.5.3	Oven Cure	35	11.5.1	Resistance	51
7.5.4	Autoclave Curing Processing	35	11.6	Surface Preparation	51
7.5.5	Press Molding	36	11.6.1	Solid Materials	51
7.5.6	Integrally Heated Tooling	36	11.6.2	Organic Compounds	51
7.5.7	Pultrusion Die Cure and Consolidation	36			

11.6.3	Plating and Inorganic Finish	52	13.8	Cable and Wire Harness Installation	72
11.6.4	Corrosion By-Products	52	13.8.1	Arrangement and Harnessing	73
11.7	Completion of the Bond	52	13.8.2	Bundle and Group Size	73
11.8	Bond Corrosion	52	13.8.3	Dead Ending	73
11.8.1	Chemical Basis of Corrosion	53	13.8.4	Splicing	73
11.9	Workmanship	55	13.8.5	Routing	74
12	Backplanes	55	13.8.6	Stress Relief and Mechanical Support	74
12.1	Definition	55	13.8.7	Slack in Cable and Wiring	74
12.2	Function Within the Enclosure	55	13.8.8	Inspection and Maintenance	75
12.3	Types	56	13.8.9	Protection and Support	75
12.3.1	Passive Backplanes	56	13.8.10	Bend Radius	76
12.3.2	Active Backplanes	56	13.8.11	Drip Loop	76
12.4	Common Technologies Used on Backplanes	56	13.8.12	Routing Near Moving Parts or Controls	76
12.4.1	I/O Connectors	56	13.8.13	Routing Near Fluid Lines	76
12.5	Design Considerations	56	13.8.14	Ground Return	76
12.6	Assembly Considerations	57	13.8.15	Shielded Wire Grounding	77
12.6.1	Tooling	57	13.8.16	Multiple Grounds	77
12.6.2	Press Alignment and Set-Up Parameters	57	13.8.17	Connectors	77
12.6.3	Inspection and Testing Considerations	57	13.8.18	Terminal Lugs	78
13	Cable and Wire Harness Assemblies	58	13.8.19	Terminal Boards and Terminal Junction Modules	78
13.1	Connector Selection	58	13.8.20	Wiring Mockup	79
13.1.1	Common Connector Definitions	58	13.8.21	Flexible Wiring	79
13.1.2	Top Level Considerations	59	13.8.22	Wire Connections and Terminals	79
13.1.3	Connector Overview	60	13.8.23	Spare Terminals	79
13.1.4	Connector Types	60	13.8.24	Electrical Tape	79
13.1.5	Shells	60	13.8.25	Sleeving	79
13.1.6	Inserts	64	13.8.26	Straps/Clamps	80
13.1.7	Contacts	65	13.8.27	Lacing Cord	80
13.1.8	Coupling Mechanism	66	13.9	Fiber Optic Cables	80
13.1.9	Rear Accessories	68	13.9.1	Design	80
13.1.10	Example of Connector Part Numbering	69	13.9.2	Reliability and Quality	81
13.2	Wiring Selection	69	13.9.3	Splicing	81
13.2.1	Conductor Degradation	69	13.10	Wire Marking Methods	83
13.2.2	Aluminum Wire	70	13.10.1	Hot Stamp Marking	83
13.2.3	Insulation Compatibility with Sealing and Servicing	70	13.10.2	Inkjet Marking	83
13.2.4	Wire Size and De-Rating	70	13.10.3	Dot Matrix Marking	83
13.2.5	Wire and Cable Identification	70	13.10.4	Laser Marking	83
13.2.6	Wire for Electromagnetic Interference (EMI)	72	13.10.5	Hand Ink Pen Marking	84
13.3	Service Life	72	13.10.6	Label Marking	84
13.4	Accessibility	72	13.10.7	Heat Shrink Sleeve	84
13.5	Manufacturing Processes	72	13.10.8	Thermal Marking	84
13.6	Maintenance and Repair	72	13.10.9	Fundamental Marking Principals	84
13.7	Smoke and Fire Hazards	72	13.11	Content of Engineering Drawings for Cable and/or Wire Harnesses	84

14 GASKETS	87	16.10 Impedance Comparison Chart	128
14.1 Conductive Elastomer EMI Gaskets	87	16.11 Bus Bar Characteristics	128
15 FASTENERS	90	16.12 Insulation Materials	129
15.1 Bolts/Threaded Fasteners	90	16.13 IGBT Laminated Bus Bar Application	129
15.1.1 Clamping Force	90	17 ASSEMBLY	130
15.1.2 Considerations for Threaded Fasteners	90	17.1 Handling	130
15.1.3 Threads	91	17.1.1 Electrostatic Discharge (ESD) Control Program	130
15.1.4 Bolt Head and Screw Head Styles	92	17.1.2 Foreign Object Debris (FOD)	130
15.1.5 Drawing Requirements for Threaded Fasteners	92	17.2 Adhesives and Adhesive Bonding	132
15.1.6 Fastener Materials	94	17.2.1 One Part Silicone	132
15.1.7 Fastener Platings, Coatings and Finishes	95	17.2.2 Seal Types and Their Function	132
15.1.8 Thread Lubricants	97	17.2.3 Preparation of Metallic and Inorganic Surfaces	132
15.1.9 Fastener Corrosion	97	17.2.4 Alkaline Cleaning	133
15.1.10 Fastener Locking Methods	98	17.2.5 Preparation of Plastic Surfaces	133
15.1.11 Washers	103	17.2.6 Preparation of Silicone Surfaces	133
15.1.12 Inserts	104	17.2.7 Primer Application	133
15.1.13 Counterfeit Fasteners	106	17.2.8 Adhesive/Sealant Application	133
15.2 Torque	109	17.2.9 Fastener Overcoat Seal	134
15.2.1 Scope	109	17.2.10 Cure	134
15.2.2 Definitions	109	17.2.11 Two-Part Epoxy	134
15.2.3 Standard Torque Values	110	17.2.12 Preparation of Metallic and Ceramic Surfaces	134
15.2.4 Nonstandard Torque Values	113	17.2.13 Preparation of Plastic Surfaces	135
15.2.5 Torque Tolerances	113	17.2.14 Preparation of Rubber Surfaces	135
15.2.6 Prevailing Torque	113	17.2.15 Application of Adhesive to Bond Surfaces ...	135
15.2.7 Lubricants	113	17.3 Soldering	135
15.2.8 Manufacturer's Suggested Torque	113	17.4 Crimping, Cabling and Harnessing	135
15.2.9 Basic Torque Determination	113	17.5 Torquing	135
15.2.10 Basic Torque Equations	114	17.5.1 Proper Torque Tool Selection	135
15.3 Rivets/Lockbolts/Rivnuts	116	17.5.2 Three Stage Torquing	136
15.3.1 Rivets	116	17.5.3 Over-Torqued Fasteners	136
15.3.2 Lock Bolts	120	17.5.4 Post-Torquing Material Application	137
15.3.3 Rivnuts	122	17.5.5 General Torquing Practices	137
15.3.4 General Guidelines for Selecting Rivets and Lock Bolts	123	17.5.6 Inspection	139
16 LAMINATED BUS BARS	124	17.6 Riveting	139
16.1 Capacitance	125	17.7 Marking	139
16.2 Inductance	125	17.7.1 Marking Requirements	139
16.3 Current	125	18 VERIFICATION AND VALIDATION (V&V)	140
16.4 Impedance	125	18.1 Introduction	140
16.5 Voltage Drop	126	18.1.1 Verification	144
16.6 Interconnections	126	18.1.2 Validation	144
16.7 Standard Formulas for Basic Electrical Properties of Power Distribution Systems	126	18.2 Environmental Tests	144
16.8 Sample Calculations for 100 Amp Systems ..	127	18.2.1 Salt Atmosphere (Corrosion) (Salt Spray) (MIL-STD-202, Test Method 101)	144
16.9 Electrical Performance Comparison Chart	127		

18.2.2	Salt Fog (MIL-STD-810, Test Method 509)	145	18.2.30	HASS Testing	152
18.2.3	Acidic Atmosphere (MIL-STD-810, Test Method 518)	145	18.3	Physical Characteristics Tests	152
18.2.4	Humidity – Component (MIL-STD-202, Test Method 103)	145	18.3.1	Vibration	152
18.2.5	Humidity – Enclosure (MIL-STD-810, Test Method 507)	145	18.3.2	Random Drop (MIL-STD-202, Test Method 203)	154
18.2.6	Immersion – Seal Effectiveness (MIL-STD-202, Test Method 104)	146	18.3.3	Shock	154
18.2.7	Immersion – Operation (MIL-STD-810, Test Method 512)	146	18.3.4	Life (Rotational) (MIL-STD-202, Test Method 206)	156
18.2.8	Seal (MIL-STD-202, Test Method 112)	146	18.3.5	Radiographic Inspection (X-ray) (MIL-STD-202, Test Method 209)	157
18.2.9	Barometric Pressure (Reduced) (MIL-STD-202, Test Method 105)	147	18.3.6	Terminal Strength (MIL-STD-202, Test Method 211)	157
18.2.10	Low Pressure (Altitude) (MIL-STD-810, Test Method 500)	147	18.3.7	Acceleration	157
18.2.11	Moisture Resistance (MIL-STD-202, Test Method 106)	147	18.3.8	Temperature, Humidity, Vibration and Altitude (MIL-STD-810, Test Method 520)	157
18.2.12	Low Temperature (MIL-STD-810, Test Method 502)	147	18.3.9	Vibro-Acoustic/Temperature (MIL-STD-810, Test Method 523)	157
18.2.13	High Temperature (MIL-STD-810, Test Method 501)	147	18.3.10	Hydrostatic, Flow and Pressure Test	158
18.2.14	Thermal Shock (MIL-STD-202, Test Method 107)	148	18.4	Electrical Characteristics Tests	158
18.2.15	Temperature Shock (MIL-STD-810, Test Method 503)	148	18.4.1	Continuity Test (IPC/WHMA-A-620)	158
18.2.16	Life at Elevated Ambient Temperature (MIL-STD-202, Test Method 108)	148	18.4.2	Shorts Test (IPC/WHMA-A-620)	158
18.2.17	Explosion (MIL-STD-202, Test Method 109)	148	18.4.3	Dielectric Withstanding Voltage (MIL-STD-202, Test Method 301 and IPC/WHMA-A-620)	158
18.2.18	Explosive Atmosphere (MIL-STD-810, Test Method 511)	148	18.4.4	Insulation Resistance Test (MIL-STD-202, Test Method 302 and IPC/WHMA-A-620)	159
18.2.19	Sand and Dust (MIL-STD-202, Test Method 110)	148	18.4.5	Voltage Standing Wave Ratio (VSWR) Test (IPC/WHMA-A-620)	159
18.2.20	Sand and Dust (MIL-STD-810, Test Method 510)	149	18.4.6	Insertion Loss Test (MIL-STD-220 and IPC/WHMA-A-620)	159
18.2.21	Flammability	149	18.4.7	Characteristic Impedance Test (IPC/WHMA-A-620)	159
18.2.22	Fungus (MIL-STD-810, Test Method 508, RTCA DO-160 Section 13)	149	18.4.8	Resistance Temperature Characteristic (MIL-STD-202, Test Method 304)	159
18.2.23	Contamination by Fluids (MIL-STD-810, Test Method 504)	150	18.4.9	Contact Resistance (MIL-STD-202, Test Method 307)	159
18.2.24	Solar Radiation (Sunshine) (MIL-STD-810, Test Method 505)	151	18.4.10	Full-Load/Burn-In Test	160
18.2.25	Rain (MIL-STD-810, Test Method 506)	151	18.4.11	Operating/Functional Testing	160
18.2.26	Icing/Freezing Rain (MIL-STD-810, Test Method 521)	151	18.5	Electromagnetic Interference (EMI) Testing	160
18.2.27	Freeze/Thaw (MIL-STD-810, Test Method 524)	151	18.5.1	Conducted Emissions, Power Leads, 30 Hz to 10 KHz (MIL-STD-461, CE101)	160
18.2.28	UV Aging of Polymeric Outdoor Enclosure Materials (GR-487, Section R3-25)	152	18.5.2	Conducted Emissions, Power Leads, 10 KHz to 10 MHz (MIL-STD-461, CE102)	160
18.2.29	HALT Testing	152	18.5.3	Conducted Emissions, Antenna Terminal, 10 KHz to 40 GHz (MIL-STD-461, CE106)	160

18.5.4	Conducted Susceptibility, Power Leads, 30 Hz to 150 KHz (MIL-STD-461, CS101)	161	18.7.2	Cable Attenuation Test (MIL-STD-2042-6, Test Method 6B1)	165
18.5.5	Conducted Susceptibility, Antenna Port, Intermodulation, 15 KHz to 10 GHz (MIL-STD-461, CS103)	161	18.7.3	Cable Assembly Link Loss Test (MIL-STD-2042-6, Test Method 6C1)	165
18.5.6	Conducted Susceptibility, Antenna Port, Rejection of Undesired Signals, 30 Hz to 20 GHz (MIL-STD-461, CS104)	161	18.7.4	Cable Continuity Test (MIL-STD-2042-6, Test Method 6D1)	165
18.5.7	Conducted Susceptibility, Antenna Port, Cross Modulation, 30 Hz to 20 GHz (MIL-STD-461, CS105)	161	18.7.5	Cable Topology End-to-End Attenuation Test (MIL-STD-2042-6, Test Method 6E1)	165
18.5.8	Conducted Susceptibility, Transients, Power Leads (MIL-STD-461, CS106)	161	18.7.6	Measurement Quality Jumper Selection Test (MIL-STD-2042-6, Test Method 6F1)	165
18.5.9	Conducted Susceptibility, Structure Current, 60 Hz to 100 KHz (MIL-STD-461, CS109)	161	18.7.7	Heavy Duty Connector Mechanical Pull Test (MIL-STD-2042-6, Test Method 6G1)	165
18.5.10	Conducted Susceptibility, Bulk Cable Injection, 10 KHz to 200 MHz (MIL-STD-461, CS114)	161	18.7.8	BOF Cable Ball Bearing Test (MIL-STD-2042-6, Test Method 6H1)	165
18.5.11	Conducted Susceptibility, Bulk Cable Injection, Excitation (MIL-STD-461, CS115)	162	18.7.9	BOF Cable Pressurization Test (MIL-STD-2042-6, Test Method 6I1)	165
18.5.12	Conducted Susceptibility, Damped Sinusoidal Transients, Cables and Power Leads, 10 KHz to 100 MHz (MIL-STD-461, CS116)	162	18.7.10	BOF Tube Seal Verification Test (MIL-STD-2042-6, Test Method 6J1)	165
18.5.13	Radiated Emissions, Magnetic Field, 30 Hz to 100 KHz (MIL-STD-461, RE101)	162	18.7.11	Cable Assembly Return Loss Test (MIL-STD-2042-6, Test Method 6K1)	165
18.5.14	Radiated Emissions, Electric Field, 10 KHz to 18GHz (MIL-STD-461, RE102)	162	18.7.12	Cable Topology End-to-End Return Loss Test (MIL-STD-2042-6, Test Method 6L1)	165
18.5.15	Radiated Emissions, Antenna, Spurious and Harmonic Outputs, 10 KHz to 40 GHz (MIL-STD-461, RE103)	162	18.8	Environmental Stress Screening (ESS) (MIL-HDBK-344)	166
18.5.16	Radiated Susceptibility, Magnetic Field, 30 Hz to 100 KHz (MIL-STD-461, RS101)	163	18.9	Visual and Mechanical Inspection and Testing	166
18.5.17	Radiated Susceptibility, Electric Field, 2 MHz to 40 GkHz (MIL-STD-461, RS103)	163	18.9.1	Visual Inspection	166
18.5.18	Radiated Susceptibility, Transient Electromagnetic Field (MIL-STD-461, RS105)	163	18.9.2	Dimensional Inspection	167
18.6	Noise Testing (MIL-STD-1474 and MIL-STD-810)	163	Figures		
18.6.1	Noise Testing (MIL-STD-1474)	163	Figure 4-1	Casting Views	14
18.6.2	Acoustic Noise (MIL-STD-810, Test Method 515)	164	Figure 4-2	Chain vs. Baseline Dimensioning	15
18.7	Fiber Optic Testing	164	Figure 4-3	False Tolerances	16
18.7.1	Visual Inspection of Fiber Optic Components (MIL-STD-2042-6, Test Method 6A1)	165	Figure 4-4	Adequate Stock Allowance	16
			Figure 4-5	Effect of Accuracy Due to Different Mold Pieces	17
			Figure 4-6	The Structure of the Welding Symbol	21
			Figure 8-1	Anodized Cross-Section	39
			Figure 8-2	CIELAB Values	40
			Figure 11-1	Effects of Poor Bonding on the Performance of a Power Line Filter	44
			Figure 11-2	Current Flow Through Two Configurations of a Direct Bond	45
			Figure 11-3	Contact Surfaces at a Bond Interface	45
			Figure 11-4	Mechanical Load on Bond Resistance	47
			Figure 11-5	Nomograph of Torque to Bolt Size	50
			Figure 11-6	Rivet Bond Path	50
			Figure 11-7	Poor Rivet Joint	50
			Figure 11-8	Basic Corrosion	53

Figure 13-1	Box Build with Multiple Connectors	58	Figure 15-5	Locking Helical-Coil	93
Figure 13-2	Box Build with Multiple Connectors	58	Figure 15-6	Split-Beam Locknut	98
Figure 13-3	Common Connection Make Up	60	Figure 15-7	Deformed-Thread Locknut	99
Figure 13-4	Assembled Connector Cut Away	60	Figure 15-8	Nylon Pellet Locknut	99
Figure 13-5	Circular Connectors	60	Figure 15-9	250 Degree F Self-Locking Elements for External Threads	100
Figure 13-6	Rectangular Connectors	61	Figure 15-10	Locking Collar	100
Figure 13-7	Hermetically Sealed Connectors	61	Figure 15-11	Castellated Nut	100
Figure 13-8	Special Application Connector	61	Figure 15-12	Jam Nut	101
Figure 13-9	Connector Shells	61	Figure 15-13	Serrated-Face Nut	101
Figure 13-10	Aluminum Shell	63	Figure 15-14	Lock Wiring	101
Figure 13-11	Brass Shell	63	Figure 15-15	Tapered Thread	102
Figure 13-12	Composite Shell	63	Figure 15-16	Nut Plate	102
Figure 13-13	Titanium Shell	63	Figure 15-17	Types of Belleville Washers	103
Figure 13-14	Stainless Steel Shell	63	Figure 15-18	Combinations of Belleville Washers	103
Figure 13-15	Nickel Aluminum Bronze Shell	63	Figure 15-19	Helical Spring Washers	103
Figure 13-16	Example of an Assembled Socket Insert	64	Figure 15-20	Tooth Lock Washers	104
Figure 13-17	Example of Standard Circular Plan Forms	64	Figure 15-21	Self-Aligning Nut	104
Figure 13-18	Contact Options	65	Figure 15-22	Wire Thread Insert Installation	105
Figure 13-19	Circular Connection with Mixed Contacts	65	Figure 15-23	Wire Thread Insert Types	105
Figure 13-20	Circular Connector with Pintail Contacts	65	Figure 15-24	Self-Tapping Inserts	105
Figure 13-21	Circular Connector with Power Contacts	66	Figure 15-25	Solid Bushing	105
Figure 13-22	Fiber Optic	66	Figure 15-26	Plastic Expandable Insert	106
Figure 13-23	Circular Connector with Quadrax Contacts	66	Figure 15-27	Molded in Place Insert	106
Figure 13-24	Dynamic Contact	66	Figure 15-28	Ultrasonic Inserts	106
Figure 13-25	Static Contact	66	Figure 15-29	United States Standard Rivet Heads	117
Figure 13-26	Bayonet Pin Connector	67	Figure 15-30	Pull-Mandrel Rivet	117
Figure 13-27	Threaded Coupling	67	Figure 15-31	Threaded-Stem Rivets	117
Figure 13-28	Anti Rotation – Vibration Resistant Connector	67	Figure 15-32	Drive-Pin Rivets	118
Figure 13-29	Reverse Bayonet Connector	67	Figure 15-33	Compression Tubular Rivet	118
Figure 13-30	Quick Release/Break Away Connector	67	Figure 15-34	Semi-Tubular Rivet	118
Figure 13-31	Push/Pull Type Connector	68	Figure 15-35	Full Tubular Rivet	118
Figure 13-32	Example of Push/Pull Receptacle	68	Figure 15-36	Semi Tubular Rivet	119
Figure 13-33	Common Example of Cable Grommet Nut	68	Figure 15-37	Split (Bifurcated) Rivet	119
Figure 13-34	Strain Relief Clamp	68	Figure 15-38	Cherry Buck Rivet	119
Figure 13-35	Quick Clamp	68	Figure 15-39	Cherry Rivet Installation	119
Figure 13-36	Braid Trap	68	Figure 15-40	Huck Blind Rivets	120
Figure 13-37	Integral Back Shell	69	Figure 15-41	Pop Rivet Installation	120
Figure 13-38	Example of Connector Part Numbering	69	Figure 15-42	Jo-Bolt	121
Figure 13-39	An Optical Fiber Breakout Cable	80	Figure 15-43	Hi-Lok Installation	121
Figure 13-40	Fiber Optic Splices	81	Figure 15-44	Installed Huckbolt Fastener	122
Figure 13-41	Mechanical Fiber Optic Splice	82	Figure 15-45	Taper-Lok Installation	122
Figure 13-42	Fusion Fiber Optic Splice	82	Figure 15-46	Rivnut Installation	122
Figure 13-43	Quick Termination Fiber Optic Connector	82	Figure 15-47	Hi-Shear Installation	123
Figure 14-1	Typical EMI Gasket Cross Sectional Profiles	89	Figure 16-1	Comparison of Wire Harness versus Laminated Bus Bar Design	124
Figure 15-1	Threaded Fasteners	90	Figure 16-2	Examples of Laminated Bus Bar Designs	124
Figure 15-2	Bolt Head and Screw Head Styles	93	Figure 16-3	Standard Formulas for Basic Electrical Properties of Power Distribution Systems	126
Figure 15-3	Locknut with Nylon Insert	93			
Figure 15-4	Lock Screw	93			

Figure 16-4	Sample Calculations for 100 Amp Systems	127	Table 13-4	Wire Size Color Code	71
Figure 16-5	Electrical Comparison Chart	127	Table 14-1	EMI Gasket Material Characteristics	88
Figure 16-6	Impedance Comparison Chart	128	Table 15-1	Pre-load Variation Produced by Different Methods of Tightening a Fastener (from Bossard Catalog)	91
Figure 16-7	Example IGBT Laminated Bus Bar Application	129	Table 15-2	Minimum Thread Engagement	94
Figure 17-1	Typical Rectangular Torquing Sequence	136	Table 15-3	Summary of Fastener Materials	95
Figure 17-2	Typical Circular Torquing Sequence	136	Table 15-4	Summary of Fastener Materials	96
Figure 17-3	Fastener Torque-Striping	137	Table 15-5	Sample of Manufacturer's Fastener Head Marking	107
Figure 17-4	Torque Staking	137	Table 15-6	ASTM Identification Markings	108
Figure 17-5	Torque Staking	137	Table 15-7	Typical Torque Values for Selected Fasteners	111
Tables					
Table 3-1	Typical Values of Emissivity	9	Table 15-8	Aluminum and Other Rivet Materials	116
Table 3-2	Correction Factor for Altitude	10	Table 15-9	Cherry Rivet Materials	120
Table 4-1	Wrought Aluminum Alloy Designation System	12	Table 15-10	Standard Rivnut Fastener Materials and Finishes	123
Table 4-2	Casting Tolerance	18	Table 16-1	Relationship between Bus Bar Size and Current	128
Table 4-3	AWS Welding Processes and Letter Designation	19	Table 16-2	Insulation Materials	129
Table 11-1	DC Resistance of Direct Bonds Between Selected Metals	46	Table 17-1	One-Part Silicone Cure Time	134
Table 11-2	Standard Electromotive Series	53	Table 17-2	Preferred Sizes of Rectangular Nameplates	140
Table 11-3	Galvanic Series of Common Metals and Alloys in Seawater	54	Table 18-1	Verification & Validation (V&V) (Inspection/Testing) for Enclosure Assemblies	141
Table 13-1	Keyway Designs	62	Table 18-2	RTCA DO-160 Table of Contents	144
Table 13-2	Common Plating Finishes	64	Table 18-3	Fungi Susceptibility of Materials	150
Table 13-3	Wire and Cable De-rating Requirements	71	Table 18-4	Steady-State Noise Categories	164

Guidelines for Design, Manufacture, Inspection and Testing of Electronic Enclosures

1 PREFACE

1.1 Scope This document has been written to assist the designers, manufacturers and end users of electronic enclosures of electrical and electronic equipment to understand the best practices to meet requirements, ensuring the reliability and function of the end item assembly for its intended design life.

An electronic enclosure, for the purpose of this document, is defined as a chassis, box, top level assembly, high level assembly (HLA), functional unit, drawer, cabinet, or other designation forming a top level system assembly. An enclosure typically consists of a combination of printed board assemblies (PBAs), cable and wire harness assemblies and other electronics and/or mechanical components, and is typically tested as a functional unit. The enclosure includes the necessary mechanical and structural elements to protect and integrate the assembly into a finished system. Enclosures are often modular components or sub-systems of larger systems, designed for replacement in the end-use environment.

1.2 Purpose This handbook provides guidelines for the design, manufacture, inspection and test for electronic enclosures. It is not enough to understand the properties of the various components, materials and processes; the user should understand what is to be achieved by the set of selected components, materials and processes within the end use environment and how to verify that the desired results have been realized.

This document is intended to be used as a reference only. It is the responsibility of the user to determine the suitability, via appropriate testing, of the selected electronic enclosure and application method for a particular end use application. An electronic enclosure may have several functions depending on the type of application. The most common are:

- a. To protect the electronic assembly from the end use environment, such as vibration, shock and other movements detrimental to electronic assemblies
- b. To incorporate into the end use environment.

1.3 Applicability This handbook covers high reliability type end item equipment, such as Aerospace, Defense, Medical, Telecom, etc. Not all specialized technologies are covered in this handbook.

This handbook is for guidance only and cannot be cited as a requirement. If it is, the supplier does not have to comply.

The use of words like, “must,” “should” and “shall” have no special meaning in this guideline. They do not indicate a binding criterion.

1.4 Classification This standard recognizes that electrical and electronic assemblies are subject to classifications by intended end-item use. Three general end-product classes have been established to reflect differences in producibility, complexity, functional performance requirements and verification (inspection/test) frequency. It should be recognized that there may be overlaps of equipment between classes.

The product class should be stated in the procurement documentation package.

CLASS 1 General Electronic Products

Includes products suitable for applications where the major requirement is function of the completed assembly.

CLASS 2 Dedicated Service Electronic Products

Includes products where continued performance and extended life is required, and for which uninterrupted service is desired but not critical. Typically the end-use environment would not cause failures.

CLASS 3 High Performance Electronic Products

Includes products where continued high performance or performance-on-demand is critical, equipment downtime cannot be tolerated, end-use environment may be uncommonly harsh, and the equipment should function when required such as life support or other critical systems.